

FIG. 1A (PRIOR ART)

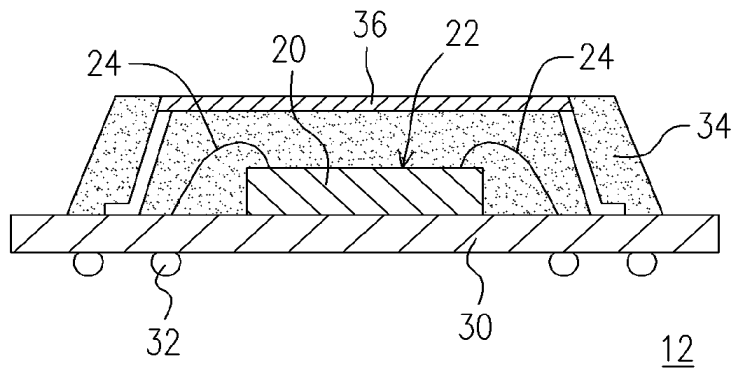


FIG. 1B (PRIOR ART)

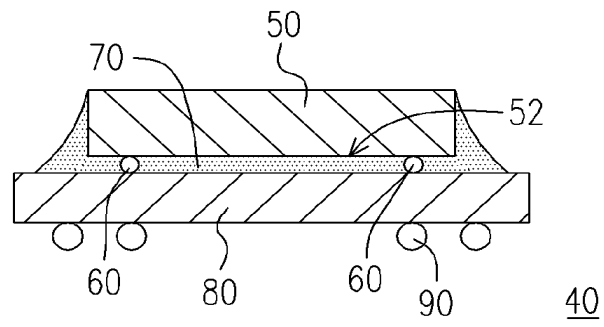


FIG. 2 (PRIOR ART)

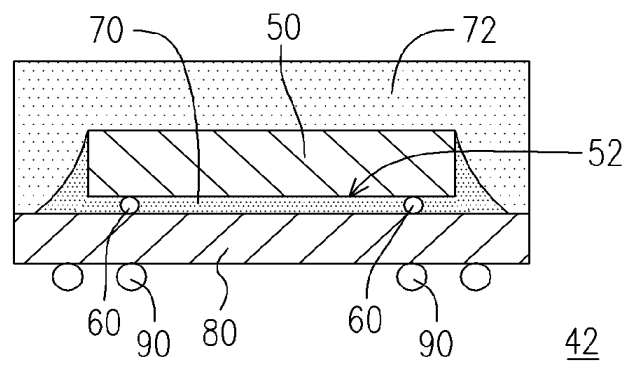


FIG. 3A (PRIOR ART)

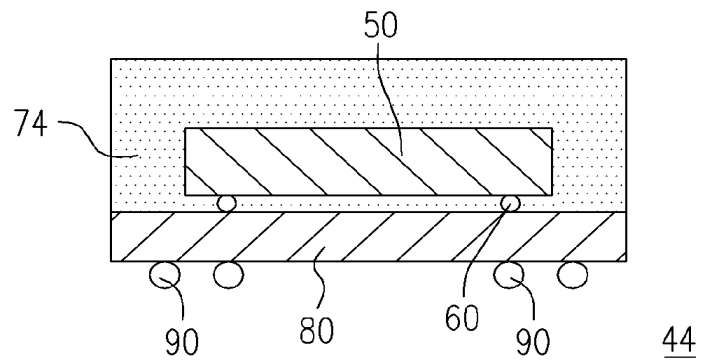


FIG. 3B (PRIOR ART)

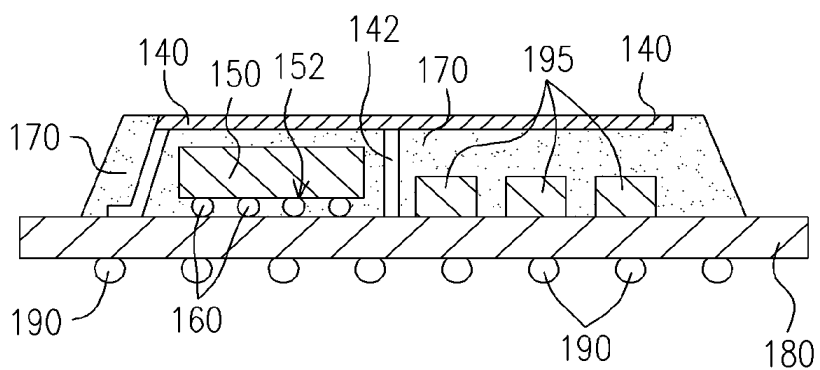


FIG. 4

100

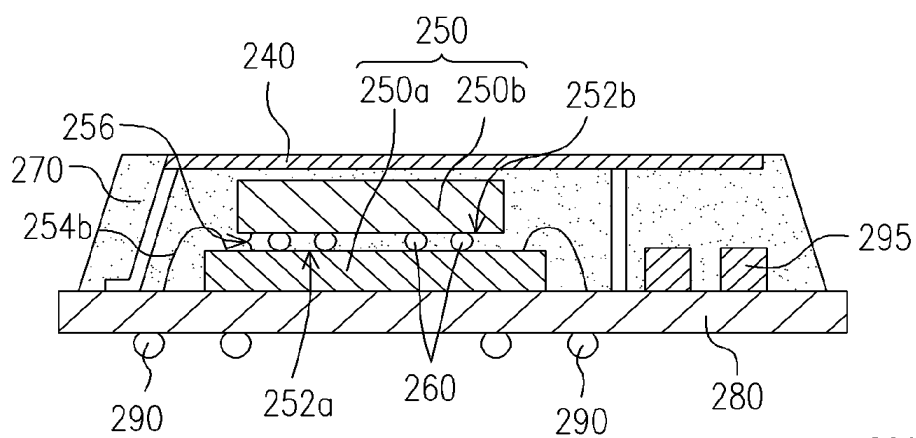


FIG. 5

200

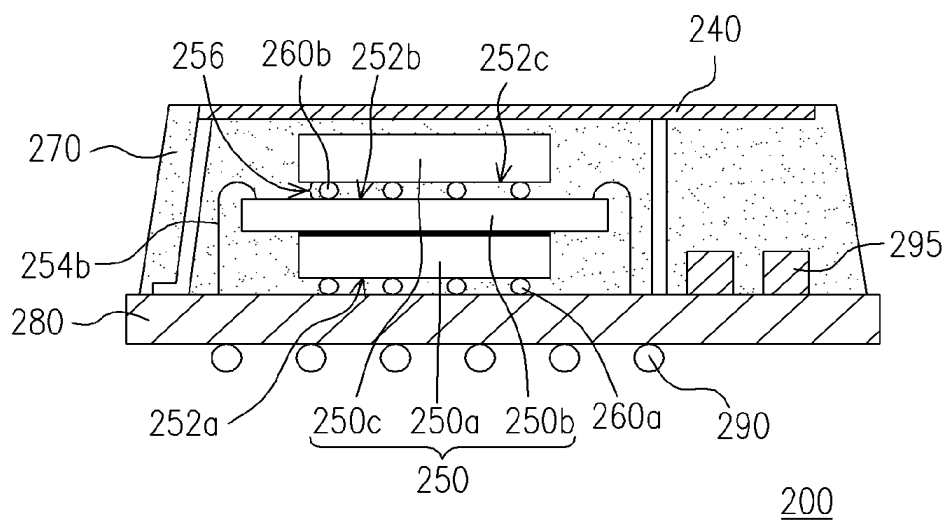


FIG. 6

200

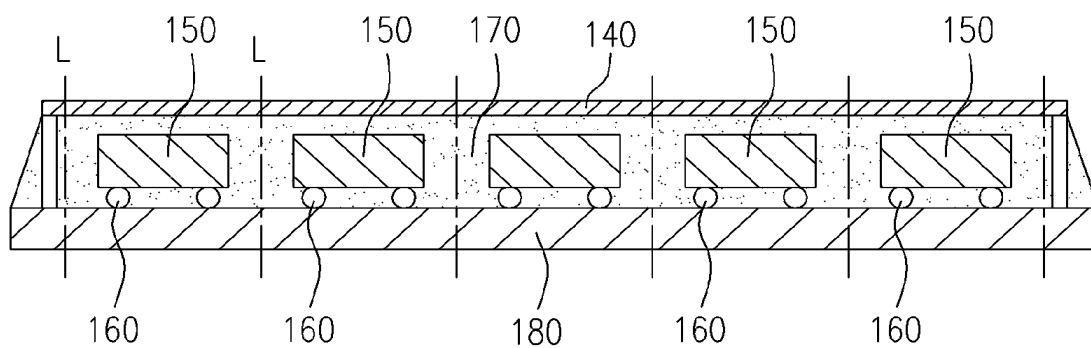
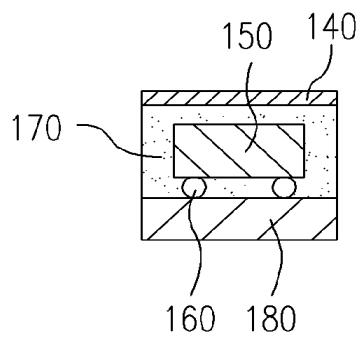


FIG. 7A



100

FIG. 7B

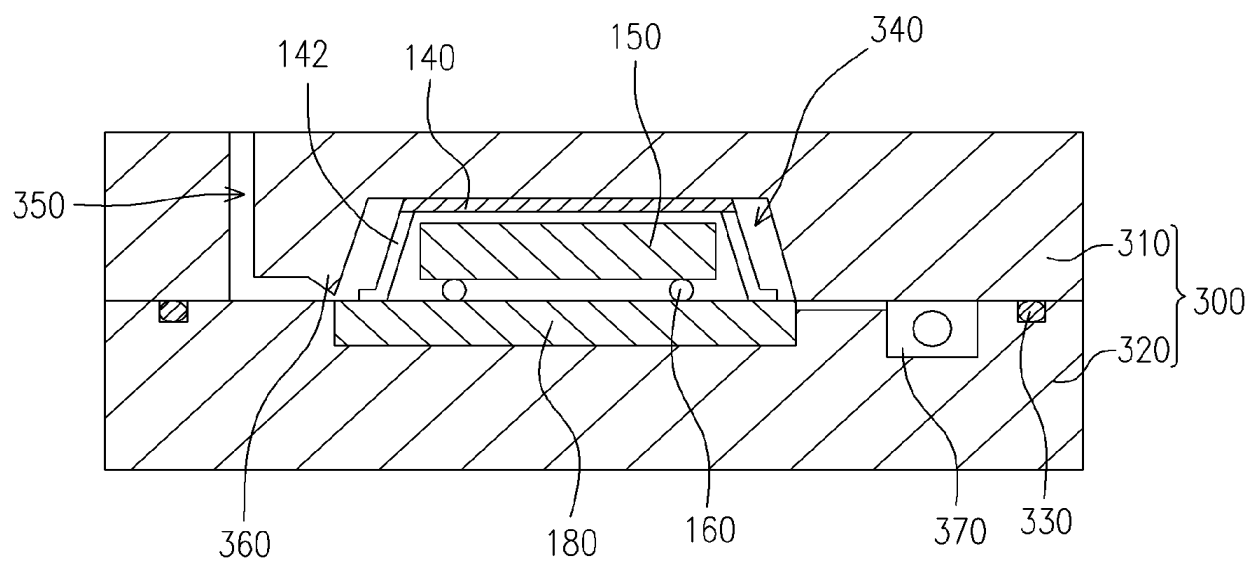


FIG. 8

	Example 1	Example 2	Example 3	Example 4	Example 5	Example 6	Example 7
Carrier Warpage *1	20μm	20μm	20μm	20μm	20μm	20μm	20μm
Solder persistence *2	▲	▲	▲	▲	▲	▲	▲
Temperature recycle reliability *3	2000 cycles	2000 cycles	2000 cycles	2000 cycles	2000 cycles	2000 cycles	2000 cycles
PCT Reliability *4	>500 hours	>500 hours	>500 hours	>500 hours	>500 hours	>500 hours	>500 hours
Heat dissipating capacity *5	5 minutes	12 minutes	20 minutes	2 minutes	20 minutes	40 minutes	35 minutes

	Example 8	Example 9	Contrast example 1	Contrast example 2	Contrast example 3
Carrier Warpage *1	20μm	30μm	80μm	40μm	50μm
Solder persistence *2	▲	▲	X	O	▲
Temperature recycle reliability *3	2000 cycles	2000 cycles	300 cycles	500 cycles	2000 cycles
PCT Reliability *4	>500 hours	>500 hours	96 hours	168 hours	>500 hours
Heat dissipating capacity *5	>60 minutes	40 minutes	10 minutes	30 seconds	30 seconds

*1 carrier warpage: height above a diagonal line of the carrier

*2 solder persistence: ▲ : JEDEC level II passed; O: JEDEC level III passed;
(n = 11) X: JEDEC level III failed

*3 temperature recycle reliability: gaseous surrounding, 65°C/15 min ~ 150°C/15 min
(n = 11)

*4 PCT reliability 121°C/2atms

*5 heat dissipating capacity: passing a 10 mA through aluminum wires on chip surface and measuring the interval before the wires are fused.

FIG. 9